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Federal Communications Commission
Office of the Secretary

Dear Ms Wilkerson:

I am the EMC engineer who performed the RFI investigation at the home of Mr. James Spencer, licensee of the Amateur Radio Call W0SR, here in Cedar Rapids, IA. As you probably know, Alliant Energy conducted a BPL trial here in the Spring of this year. Mr. Spencer's ability to conduct two-way HF communications was adversely affected by the BPL signals, and that was the situation which led to my making test readings at his station location.

Briefly, station W0SR is located about 180 meters from the nearest active BPL node of the trial system. Interference from the trial BPL system lasted the entire time that the system was active, which was from late March through late June, 2004. Alliant Energy, and their equipment vendor, Amperion, did employ both frequency notching and system signal transmission level adjustment during the trial period, with varying degrees of effectiveness, and none of it successful at eliminating harmful levels of interference within the assigned Amateur Radio HF bands.

Here are two examples from the Test Report that I wrote on behalf of the Cedar Rapids BPL Steering Committee, and which was submitted to Alliant Energy and the FCC (as part of reply Comments on Docket 04-37):

This first figure shows the spectrum around the 17m Amateur Band, with the plot spanning 17.0 to 19.0 MHz. The 17m Band is denoted by the BLACK line near bottom center of the plot. The BLUE trace was made with the BPL system ON, and the YELLOW trace was made with the BPL system switched off (with due thanks to Alliant Energy). Note that there is a decrease in the blue trace at the lower frequency end of the 17m Band, and I believe that decrease to be an attempt to notch the band. However, please also note that the notch does not extend across the band and that the deepest part of the notch is actually below the 17m Band, making the notch's value worthless. The YELLOW signals are partly due to skywave signals (the traces were taken in late afternoon, when 17m would support skywave
propagation) and partly from power line noise, a long standing problem at W0SR.

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The figure below shows the area just below and in the 10m Amateur Band. (The 28.0 to 29.7 MHz band is denoted by a black line on the plot.) Again, BLUE trace is BPL ON, and YELLOW is without BPL. In this plot, most of the yellow signals are skywave signals. Please note the following about this
plot:

1. The notching missed again. Although most of the 10m band has reduced BPL signal, the lower 100 kHz of the band is receiving full BPL signal strength.

2. The notching is NOT deep enough. Note that most of the yellow signals are of equal or lower amplitude than the notched BPL signals. It is those areas where communications are NOT possible and THAT is harmful interference!

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3. In both this plot, and the one above, I added a MAGENTA trace line to the plot. That trace is at a level which represents 1 microvolt of signal in a 50 ohm system, or -107 dBm. The reason I added that trace is because most communication receivers are able to achieve somewhere around a 10 dB signal-to-noise ratio (or better) at 1 microvolt input. That is a very good number for conducting communications. HOWEVER, IF THERE IS ON-CHANNEL INTERFERENCE AT LEVELS OF 1 MICROVOLT OR MORE, THEN NO COMMUNICATIONS ARE POSSIBLE BECAUSE THE USABLE SIGNAL-TO-NOISE HAS BEEN REDUCED TO NEAR 0 dB.

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I submit my point #3, above, as the reason for my saying that notching to the levels presently achieved does not work. The in-notch signals would have to be about 20 to 30 dB LESS than they are in the above examples in order to be effective.

Just so that there is no confusion on anyone's part about the above plots, let me state the following:

A. All plots were taken at station W0SR using Agilent spectrum analyzers and saved onto floppy disc. Date and time stamps, with serial number of the spectrum analyzer, are available for all files.

B. All plots were made using the antennas and transmission lines of station W0SR - NOT compliance measurement antennas at 3m or 10m from the power lines. The measurement bandwidth of the spectrum analyzers was set at 3 kHz, NOT the compliance measurement bandwidth. That is because communication receivers use bandwidths of between 2 kHz and 3 kHz for voice SSB signal reception. The object of the testing was to duplicate what a communication receiver "sees" when BPL signals are within its tuned range.

C. The performance of the Agilent spectrum analyzers, at 3 kHz bandwidth, was within one (1) order of magnitude for signal sensitivity with respect to communication grade receivers. All plotted signals were more than 6 dB above the instrument noise floor.

I am attaching a file (extracted from the Cedar Rapids BPL Steering Committee report) that contains performance charts for modern communications receivers, as well as some of years past. Please note either the rated sensitivity levels or the levels at which acceptable signal-to-noise performance is achieved, but ONLY if there is no on-channel interference present. The actions and statements by the Commission to date on the BPL issue have been centered almost solely on radiated emissions compliance of the BPL systems and NOT on interference issues to spectrum users. Those users have communication antennas and receivers, not compliance antennas and spectrum analyzers. The situation at W0SR more than amply demonstrates why notching does not work and why it will not work in its present form. It also should be an indicator of what will happen when BPL signals are even closer to spectrum users than the 180m separation at this site.

Thank you for your consideration of this information.

Sincerely,

Dale Svetanoff, Amateur Radio Licensee WA9ENA
N.A.R.T.E Certified EMC Engineer, Cert. # EMC-001549-NE

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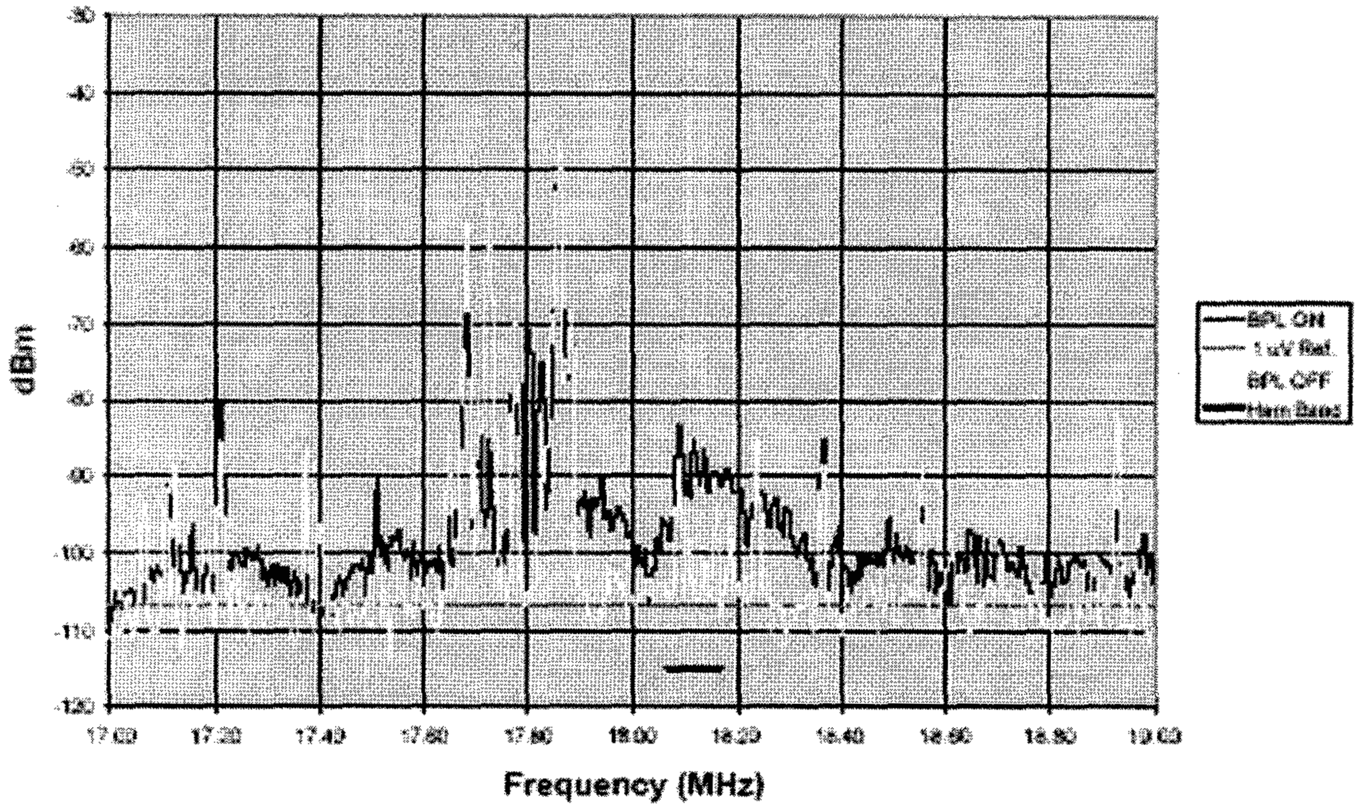
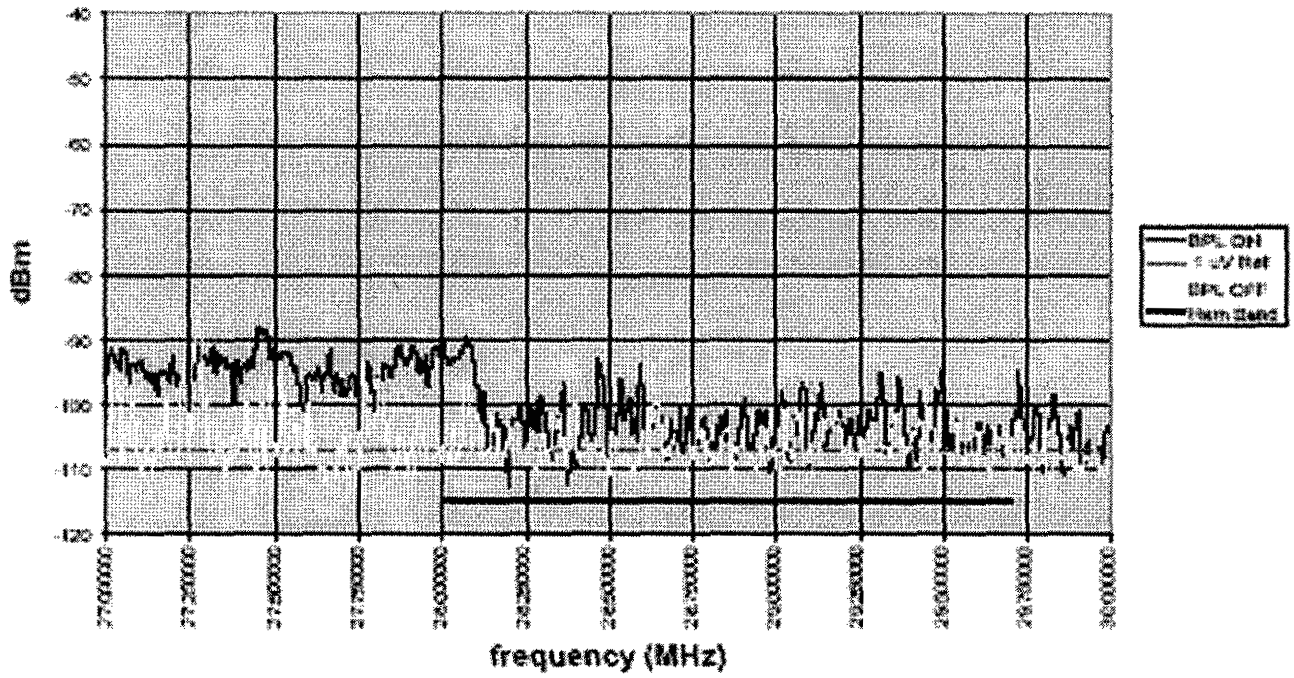
(See attached file: Communication Receiver Characteristics.doc)

17-19MHz   3kHz res BW



27-30MGz Tri-Band 3kHz res BW



Communication Receiver Characteristics

Make/Model	Description	Receive Frequency Tuning Range[1]	Rated/Measured Sensitivity @ Bandwidth[1,2] or Mode	Rated/Measured S-Meter Response[1]
Alinco DX-70TH	Current model basic transceiver	150 kHz to 30 MHz; 50 to 54 MHz	1.8 to 30 MHz: 0.25 μV 50 to 54 MHz: 0.15 μV all @ 2.4 kHz bandwidth	50 μV @ 14 MHz = S-9, pre-amp on; 146 μV @ 14 MHz = S-9, pre-amp off
Collins 75S-1	Late 1950's tube receiver	3.4 to 30 MHz	3.4 to 30 MHz: 1.0 μV for 15 dB S+N/N @ 2.1 kHz	~ 100 μV = S-9
Collins 75S-3	Early 1960's tube receiver	3.4 to 30 MHz	3.4 to 30 MHz: 0.5 μV for 10 dB S+N/N @ 2.1 kHz	~ 60 μV = S-9
Collins KWM-380	Late 1970's solid state transceiver	1.6 to 29.999 MHz	1.6 to 29.999 MHz: <0.5 μV for 10 dB S+N/N	Varies by band, range of 14 to 28 μV for S-9
Icom IC-706 MkII G	Current model wide range transceiver	30 kHz to 200 MHz; 400 to 470 MHz	1.8 to 30 MHz: <0.15 μV; 50 to 54 MHz: <0.12 μV – CW/SSB modes in both ranges	11 μV @ 14.2 MHz = S-9, pre-amp on; 34 μV @14.2 MHz = S-9, pre-amp off
Icom IC-718	Current model basic level transceiver	30 kHz to 30 MHz	0.03 to 30 MHz: <0.16 μV for 10 dB S/N, CW/SSB modes	38 μV @ 14 MHz = S-9, pre-amp on; 149 μV @ 14 MHz = S-9, pre-amp off
Icom IC-765	Early 1990's deluxe model transceiver	Amateur bands 1.8 to 30 MHz	1.8 to 30 MHz: 0.15 μV with pre-amp on	24 μV @ 14 MHz = S-9, pre-amp on; 65 μV @ 14 MHz = S-9, pre-amp off
Japan Radio Company JRC-135HP	1990's model transceiver	100 kHz to 30 MHz	1.6 to 30 MHz: 0.31 μV	37 μV @ 14 MHz = S-9
Kenwood TS-570S(G)	Current model transceiver	500 kHz to 30 MHz; 30 to 60 MHz	1.7 to 24.5 MHz: 0.2 μV; 24.5 to 30 MHz: 0.13 μV; 50 to 54 MHz: 0.13 μV, all for 10 dB S+N/N, CW/SSB/FSK modes	25 μV @ 14 MHz = S-9, pre-amp on; 94 μV @ 14 MHz = S-9, pre-amp off; 12 μV @ 52 MHz = S-9, pre-amp on; 90 μV @ 52 MHz = S-9, pre-amp off.
Kenwood TS-2000	Current model wide range transceiver	30 kHz to 60 MHz; 118 to 174 MHz; 220 to 512 MHz	1.7 to 24.5 MHz: <0.2 μV; 24.5 to 30 MHz: <0.13 μV; 50 to 54 MHz: <0.13 μV, all for 10 dB S/N, CW/SSB modes	24 μV @ 14.2 MHz = S-9, pre-amp on; 110 μV @ 14.2 MHz = S-9, pre-amp off; 15 μV @ 52 MHz = S-9, pre-amp on; 170 μV @ 52 MHz = S-9, pre-amp off.
Lowe HF-150	Early 1990's basic receiver	30 kHz to 30 MHz	0.5 to 30 MHz: 0.5 μV, pre-amp off; 0.2 μV pre-amp on, all for 10 dB S+N/N @ 2.6 kHz SSB bandwidth	N/A (receiver does not have an S-meter)

[1] Information taken from manufacturer's specification sheets or from ARRL test lab reports. In some cases, S-meter performance will vary by band or frequency range.
[2] Rated bandwidth information is from ARRL test lab reports, when available. In some cases, no information is available to indicate the bandwidth used for determining performance specifications.

Make/Model	Description	Receive Frequency Tuning Range[3]	Rated/Measured Sensitivity @ Bandwidth[3,4] or Mode	Rated/Measured S-Meter Response[3]
Ten-Tec Orion	Current model deluxe transceiver	Dual receivers: 100 kHz to 30 MHz and all Amateur bands 1.8 through 29.7 MHz	Amateur band receiver, full range: <0.18 μV typical for 10 dB S/N @ 2.4 kHz bandwidth	33 μV @ 14 MHz = S-9, pre-amp on; 135 μV @ 14 MHz = S-9, pre-amp off
Watkins-Johnson HF-1000	Mid-1990's deluxe receiver	5 kHz to 30 MHz	500 kHz to 30 MHz: 0.35 μV for 16 dB S+N/N @ 300 Hz bandwidth (CW mode), pre-amp off	Meter is calibrated in dBm, not S-units; -73 dBm (50 μV) input @ 14 MHz = reading of -85 dBm.
Yaesu FT-857	Current model wide range transceiver	100 kHz to 56 MHz; 76 to 108 MHz; 118 to 164 MHz; 420 to 470 MHz	1.8 to 30 MHz: <0.2 μV; 50 to 54 MHz: <0.13 μV – CW/SSB modes in both ranges	6.6 μV @ 14.2 MHz = S-9, pre-amp on; 17 μV @14.2 MHz = S-9, pre-amp off; 5.3 μV @ 52 MHz = S-9, pre-amp on; 14 μV @ 52 MHz = S-9, pre-amp off.
Yaesu FT-1000 MP Mark-V Field	Current model deluxe transceiver	100 kHz to 30 MHz	1.8 to 30 MHz: <0.16 μV @ 2.0 kHz bandwidth – SSB/CW modes	48 μV @ 14.2 MHz = S-9, pre-amp on; 135 μV @ 14.2 MHz = S-9, pre-amp off

[3] Information taken from manufacturer's specification sheets or from ARRL test lab reports. In some cases, S-meter performance will vary by band or frequency range.

[4] Rated bandwidth information is from ARRL test lab reports, when available. In some cases, no information is available to indicate the bandwidth used for determining performance specifications.